



NATIONAL CERTIFIED TESTING LABORATORIES

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www.nctlinc.com

ASTM E1996-2002, 2004, 2006, 2009 & 2012a
ASTM E1886-2004, 2005

IMPACT & CYCLING TEST REPORT SUMMARY

RENDERED TO:

EVERGREEN HOUSE
13645 NE 126TH PLACE
KIRKLAND, WA. 98034

Window Type: Evergreen House Standard Fixed Window System

On 10/16/2013, Evergreen House completed impact testing at National Certified Testing Laboratories in Everett, WA. All tests were performed in full accordance with ASTM E1886 and ASTM E1996 with no deviations (Ref: NCTL-310-3720).

Tested Size:	Overall 1445 mm (56 7/8") wide by 741 mm (30 3/4") high
Glazing Configuration:	One (1) lite of 6 mm (1/4") over 6 mm (1/4") tempered / laminated glass with a PVB interlayer and an overall of 14 mm (9/16") thick.
Level of Protection:	Basic Protection
Wind Zone:	Wind Zone 3 – 58 m/s (130 mph) ≤ basic wind speed ≤ 63 m/s (140 mph), or 54 m/s (120 mph) ≤ basic wind speed ≤ 63 m/s (140 mph) and within 1.6 km (one mile) of the coastline. The coastline shall be measured from the mean high water mark.
Assembly Height Above Ground Level:	Less than or equal to 9.1 m (30') basic protection
Impact Missile Used:	Missile D - 2375 mm (96") long and weighed 4100 g (9.0 lbs)
Positive Design Pressure:	+ 1680 pa (35.0 psf) – 118.42 mph
Negative Design Pressure:	- 1680 pa (35.0 psf) – 118.42 mph

Reference must be made to NCTL Report Number NCTL-310-3720 dated 10/17/2013 for complete test sample description and data.

National Certified Testing Laboratories

Jeffrey M. Douglas
Laboratory Manager



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ASTM E1996-2002, 2004, 2006, 2009 & 2012a
ASTM E1886-2004, 2005

IMPACT & CYCLING PERFORMANCE TEST REPORT

NCTL-310-3720

REPORT TO:

EVERGREEN HOUSE
13645 NE 126TH PLACE
KIRKLAND, WA. 98034

REPORT NUMBER: NCTL-310-3720
REPORT DATE: 10/17/2013

MODEL/SERIES:

EVERGREEN HOUSE STANDARD FIXED WINDOW SYSTEM

Report Number NCTL-310-720

Report Date 10/17/2013

Report To Evergreen House
13645 NE 126th Place
Kirkland, WA. 98034

Test Start Date 10/16/2013
Test End Date 10/17/2013

Specification ASTM E1996-02/04/06/09/12a, "Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes"

ASTM E1886-04/05, "Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials"

Description of Sample Tested

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

Model/Type: Evergreen House Standard Fixed Window System

Configuration O

Frame Size 1445 mm (56 7/8") wide by 741 mm (30 3/4") high

Frame Type Extruded aluminum.

Joint Construction Frame
All corners were butt joined and screw-connected

Glazing Components
Overall 14 mm (9/16") nominal.
Glass Thickness One (1) lite of 6 mm (1/4") over 6 mm (1/4") tempered / laminated glass with a PVB interlayer

Glazing System The glass was set on blocks, bedded against a double sided Norton Foam tape and GE SCS 2800 Silicone Sealant on the exterior side of the glazing pocket and retained with aluminum glass stops and 3 mm (1/8") x 10 mm (3/8") PVC glazing tape on the interior side. The aluminum glass stops were screw-connected using #10 FHSS screws at approximately 457 mm (18") on center.

Installation Method The windows were installed into a 51 mm (2") by 152 mm (6") wood buck using Five (5) #12 x 51 mm (2") long self tapping screws through the wood buck continuing into the frame on each short and long side. Twenty (20) screws total.

TEST RESULTS

IMPACT TEST PARAMETERS

The appropriate missile to be used for impact tests was selected in accordance with Section 6 of ASTM E1996 based on the following criteria:

Level of Protection:	Basic Protection
Wind Zone:	Wind Zone 3 – 58 m/s (130 mph) ≤ basic wind speed ≤ 63 m/s (140 mph), or 54 m/s (120 mph) ≤ basic wind speed ≤ 63 m/s (140 mph) and within 1.6 km (one mile) of the coastline. The coastline shall be measured from the mean high water mark.
Assembly Height Above Ground Level:	Less than or equal to 9.1 m (30') basic protection

IMPACT TEST RESULTS

Large missile impact tests were conducted using a #2 Southern Yellow Pine 2.4 m (2 x 4) measuring 96" in length and weighing 4100 g (9 lbs) (Missile D) as shown in Table 2 of ASTM E1996. Missile speeds and impact locations were in accordance with Tables 2, 3 & 4 and Section 5.3 of ASTM E1996.

For pass/fail criteria, no penetration is defined as 'no tear longer than 130 mm (5") in length and 1 mm (1/16") wide or no opening through which a 76 mm (3") diameter solid sphere can freely pass' per Section 7 of ASTM E1996. All specimens were conditioned at 70° F ± 15°F prior to testing. Missile orientation at impact complies with section 11.2.2 of ASTM E1886.

Missile Type & Weight: #2 Southern Yellow Pine 2x4, Length 92" & 9 lbs.

	Location	Comments	Speed
Specimen 1 Impact	Bottom left corner of Laminated Glass within a 65-mm (2 1/2-in.) radius circle and with the center of the circle located 150 mm (6 in.) from supporting members.	No Penetration/ Passed	50.0 Ft./Sec.
Specimen 2 Impact	Center point of Laminated Glass within a 65-mm (2 1/2-in.) radius circle.	No Penetration/ Passed	50.0 Ft./Sec.
Specimen 3 Impact	Upper right corner of Laminated Glass within a 65-mm (2 1/2-in.) radius circle and with the center of the circle located 150 mm (6 in.) from supporting members at a diagonally opposite corner from Specimen 1.	No Penetration/ Passed	50.0 Ft./Sec.

Results: After impacts, there was no penetration or separation of glass from the frame. Upon completion of testing, all specimens meet the requirements of ASTM E1996, Section 7.

PRESSURE CYCLING TEST RESULTS

Specimens 1, 2, 3

Design Pressure +35.0 psf/ -35.0 psf

Positive Loads

Range of Test	Actual				# of Cycles	Result
+0.2 to +0.5 DP	7.0	psf to	17.5	psf	3,500	Passed
+0.0 to +0.6 DP	0.0	psf to	21.0	psf	300	Passed
+0.5 to +0.8 DP	17.5	psf to	28.0	psf	600	Passed
+0.3 to +1.0 DP	10.5	psf to	35.0	psf	100	Passed

Negative Loads

Range of Test	Actual				# of Cycles	Result
-0.3 to -1.0 DP	10.5	psf to	35.0	psf	50	Passed
-0.5 to -0.8 DP	17.5	psf to	28.0	psf	1,050	Passed
-0.0 to -0.6 DP	0.0	psf to	21.0	psf	50	Passed
-0.2 to -0.5 DP	7.0	psf to	17.5	psf	3,350	Passed

Results: Upon completion of testing, the specimens meet the requirements of ASTM E1996, Section 7.

TEST COMPLETED: 10/17/2013

The listed impact test results were secured by using the ASTM E1886 test method and indicate compliance with the performance requirements of ASTM E1996 for the listed test parameters at the following design pressures:

Positive Design Pressure: + 35.0 psf
Negative Design Pressure: - 35.0 psf

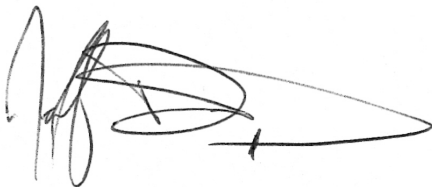
This test report was prepared by National Certified Testing Laboratory (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. All testing was performed in compliance with the referenced test method or specification and any deviations are noted. Ambient conditions during the referenced testing are available upon request. Any film employed during testing had no effect upon test results. The test specimen was supplied to NCTL by the above named client. NCTL is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained by NCTL. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods with any deviations noted. This report may not be reproduced, except in full, without the written consent of NCTL.

National Certified Testing Laboratories



Chris Shafer
Technician



Jeffrey M. Douglas
Laboratory Manager

CAS/JD

Attachments

Appendix A - Drawing & Revision Summary

Appendix B - Drawings

APPENDIX A

Section 1:

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were reviewed (as submitted) for Product Verification
(Reference: NCTL-310-3720)

See Attached Documentation;
any deviations noted.

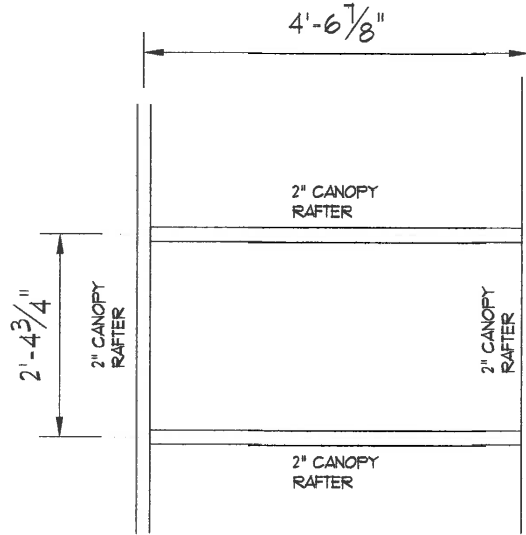
Note: The above referenced component drawings along with representative sections of the test specimen will be retained per procedure by NCTL. This testing facility assumes that all information provided by the client is accurate.

Section 2:

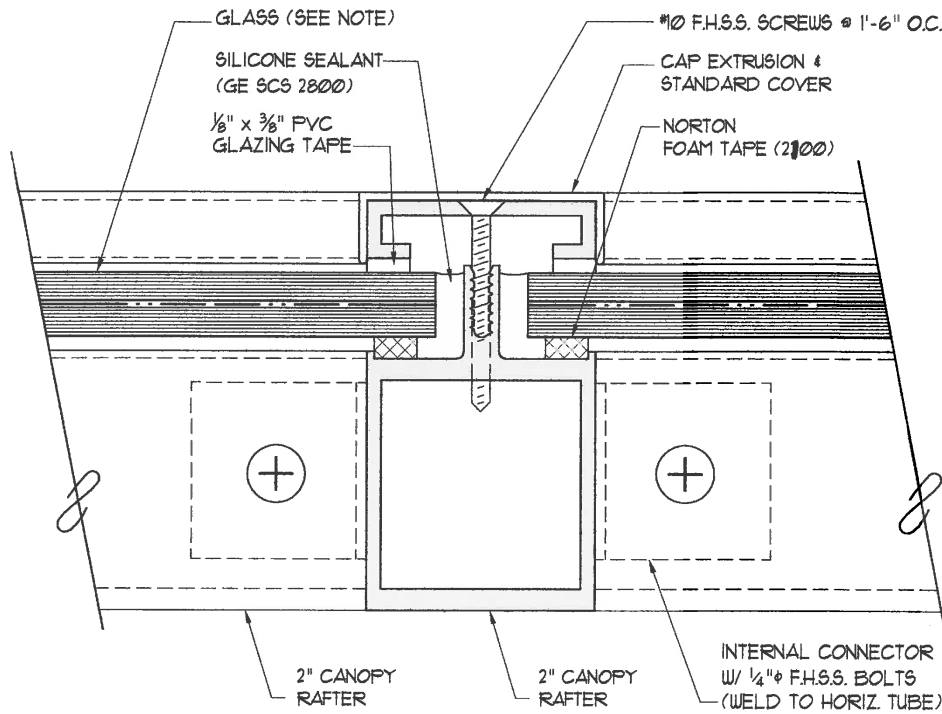
<u>Identification</u>	<u>Date</u>	<u>Page & Revision</u>
Original Issue	10/18/2013	Not Applicable

APPENDIX B

DRAWINGS



ELEVATION VIEW
 SCALE: NTS



RAFTER DETAIL
 SCALE: FULL

NOTE:

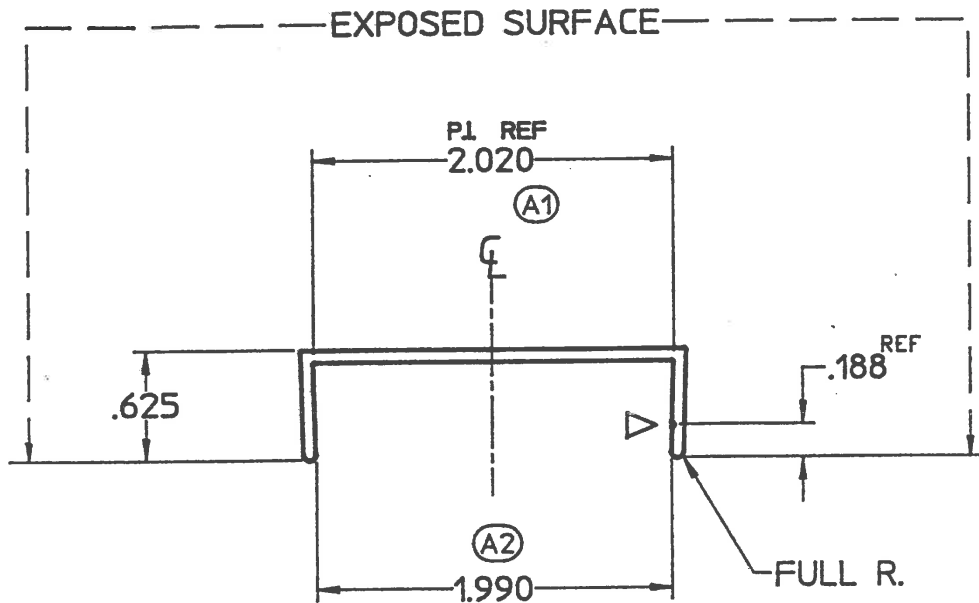
Rafter Framing: Aluminum Spec 6005-T5
 Other Framing: Aluminum Spec 6063-T5
 Aluminum Finish: Factory Applied Oven Baked Kynar Paint.
 (Color By Owner/ Architect, please provide Sample)

Sound Transit Glazing: 3/8" Clear Tempered Laminated w/ 060 Clear PVB Interlayer.

ALL DIM'S TO BE FIELD VERIFIED PRIOR TO FABRICATION

EVERGREEN HOUSE	
13645 NE 126th Place, Kirkland, WA 98034 (425) 821-1025 FAX (425) 823-5619	
WindBourne Debris Test	
DATE: AS NOTED	DATE: 10/16/13
DESIGNER: JUAN P. DELGADO	DATE: 10/16/13
PROJECT: G-1	DATE: 10/16/13

A-14043	R.A.S.C.O. (KENT) (EVERGREEN HOUSE)		10291
DRAWING NUMBER	CUSTOMER NAME	PART NO.	DIE NO.



ACTUAL SIZE

.070 TYP. WALL THICKNESS
EXCEPT AS SHOWN

.010 R ON ALL CORNERS
EXCEPT AS SHOWN

ANODIZING INC. I.D. MARK .015 R. x .015 DEEP U.O.S. △

REVISIONS		PART NAME/USE	FRAME COVER
		DRN G.A.B. TIE	DATE 10-15-90
	A	① DIM WAS 1770, ② DIM WAS 1990, ADDED I.D. MARK, ADDED EXPOSED SURF, WT/FT WAS .253, 4-20-94 DEC	DIE SIZE 9 X 1 FEEDER PLATE ---- BACKER 745 BOLSTER 4 / 4 BILLET 7" R/R 50 HOLES 4
			EST WT/FT .274 EST PERI 6.624 ADJ. PERI ---- EST AREA .228 CIRCLE SIZE 1.5-2 FACTOR 24 TYPE SOLID

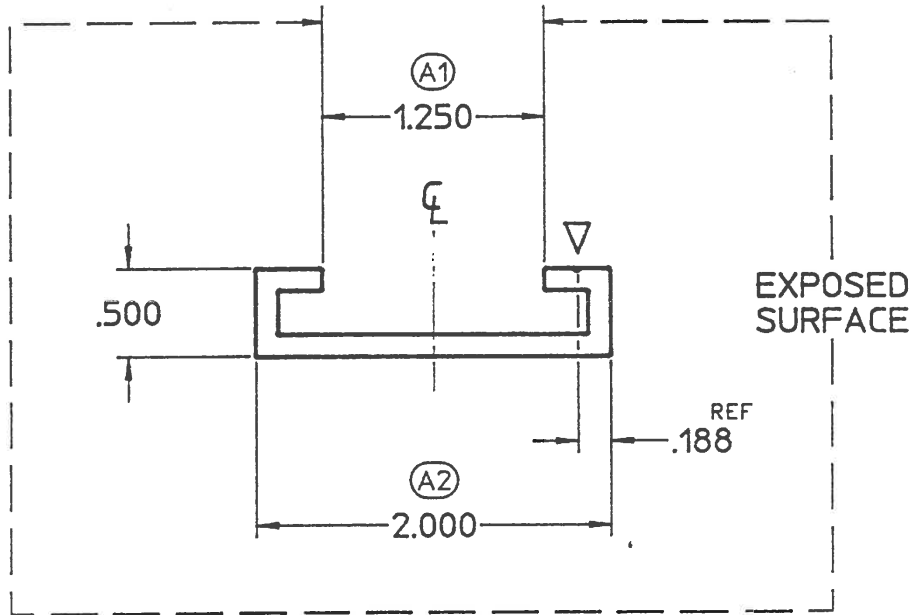
STANDARD COMMERCIAL TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE.



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 PORTLAND, OREGON

3 of 5

A-9158	R.A.S.CO. (KENT) (EVERGREEN HOUSE)		6498
DRAWING NUMBER	CUSTOMER NAME	PART NO.	DIE NO.




.125 TYP. WALL THICKNESS
 EXCEPT AS SHOWN
.010 R ON ALL CORNERS
 EXCEPT AS SHOWN

ANODIZING INC. I.D. MARK .015 R. x .015 DEEP U.O.S.

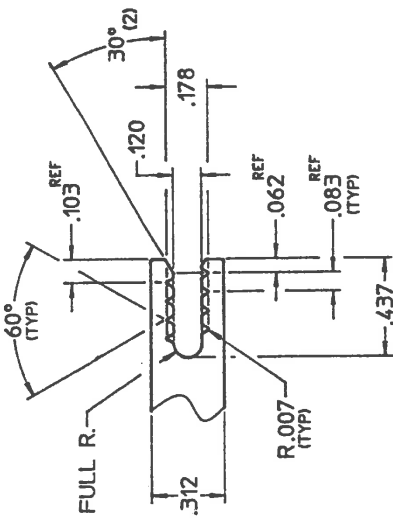
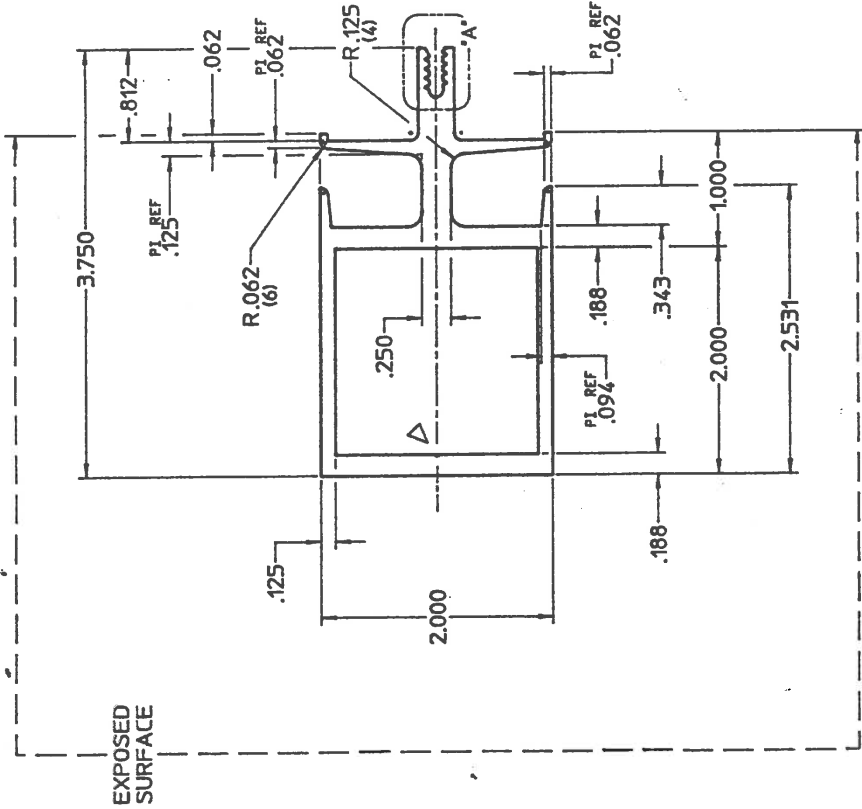
REVISIONS		PART NAME/USE	CLOSED BACK CHANNEL	
		DRN GAB	TIE	
		DATE	9-22-86	
		DIE SIZE	11 x 1-1/4	
	A	① DIM WAS 1.250, ② DIM WAS 2.000, ADDED	EST WT/FT	.487
		LD. MARK, WT/FT WAS .450, 4-20-94 DEC	FEEDER PLATE	---
			EST PERI	6.716
			BACKER	2794
			ADJ. PERI	----
			BOLSTER	8 / 8
		EST AREA	.406	
		BILLET	9"	
		CIRCLE SIZE	2 - 2.5	
		R/R	57	
		FACTOR	14	
		HOLES	3 (LN2)	
		TYPE	SOLID	

STANDARD COMMERCIAL TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE



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 PORTLAND, OREGON

A-17454	R.A.S.CO. (KENT)	13103
DRAWING NUMBER	CUSTOMER NAME	DE NO.
		PART NO.



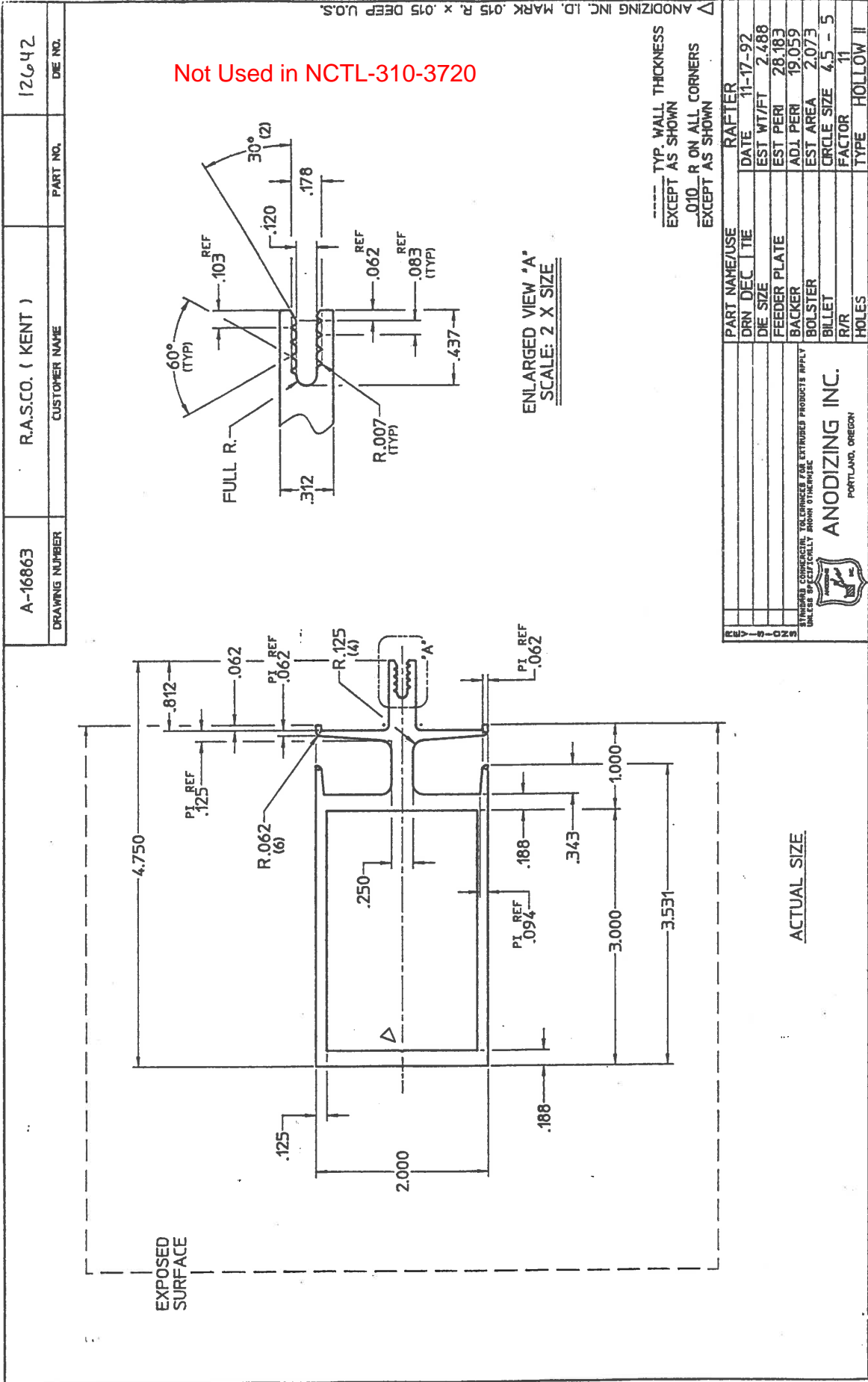
ENLARGED VIEW 'A'
 SCALE: 2 X SIZE

--- TYP WALL THICKNESS
 EXCEPT AS SHOWN
 .010 R ON ALL CORNERS
 EXCEPT AS SHOWN

ANODIZING INC. ID. MARK .015 R. X .015 DEEP U.S.	ANODIZING INC. PORTLAND, OREGON
PART NAME/USE DRN DEC LITE DIE SIZE FEEDER PLATE BACKER BOLLISTER BILLET R/R HOLES	RAFTER DATE 4-27-93 EST WT/FT 2.188 EST PERI 24.183 ADJ PERI 17.059 EST AREA 1.823 ORCLE SIZE 4 - 4.5 FACTOR 11 TYPE HOLLOW II
PART NAME/USE DRN DEC LITE DIE SIZE FEEDER PLATE BACKER BOLLISTER BILLET R/R HOLES	
ANODIZING INC. PORTLAND, OREGON	

ACTUAL SIZE

Debbie



Not Used in NCTL-310-3720

--- TYP. WALL THICKNESS
 EXCEPT AS SHOWN
 .010 R ON ALL CORNERS
 EXCEPT AS SHOWN

REF	DESCRIPTION	DATE	BY	REV
1	RAFTER	11-17-92		
2	EST WT/FT	2.488		
3	EST PERI	28.183		
4	ADJ PERI	19.059		
5	EST AREA	2.073		
6	CIRCLE SIZE	4.5 - 5		
7	FACTOR	11		
8	TYPE	HOLLOW II		

ANODIZING INC. PORTLAND, OREGON

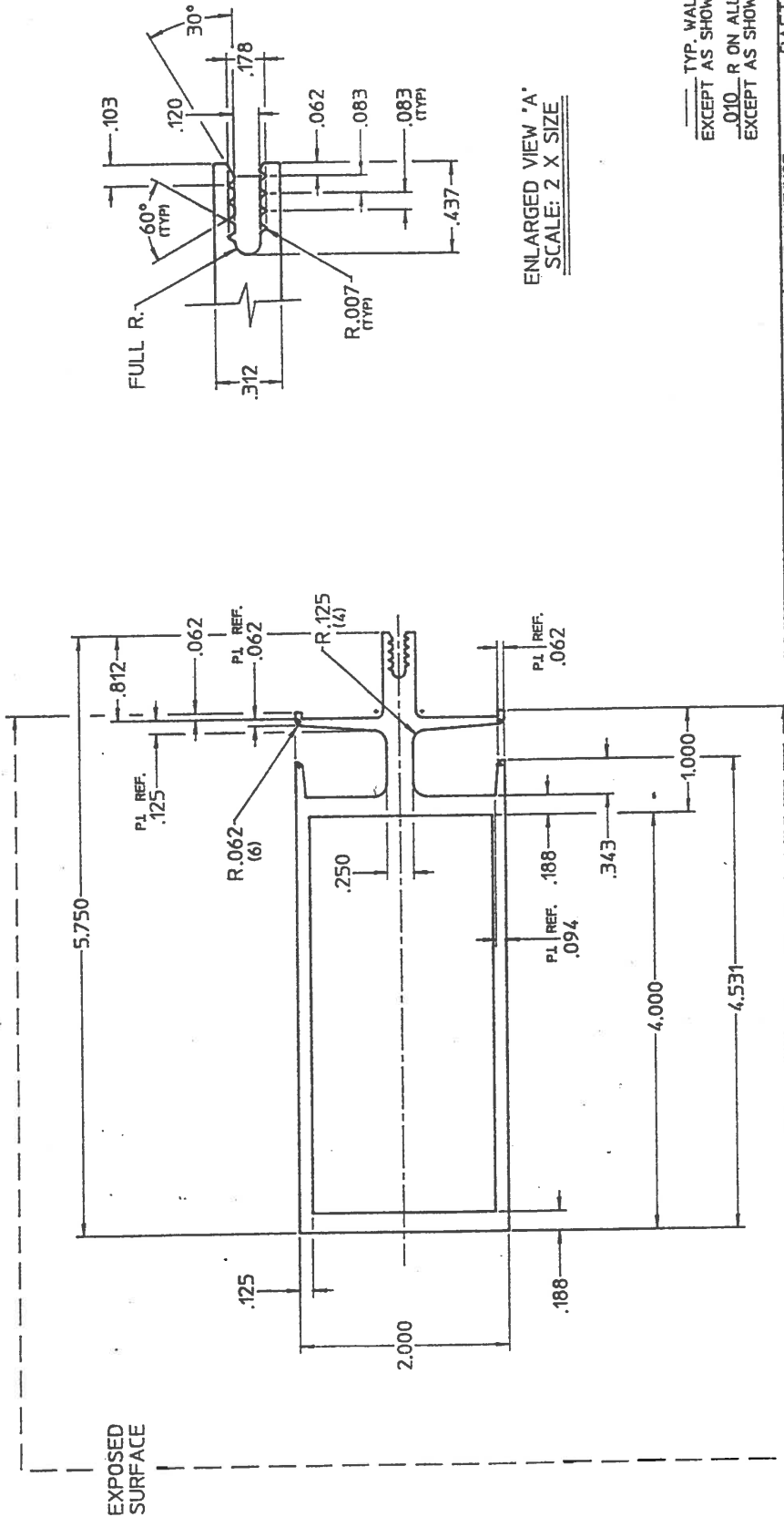
SALES REPRESENTATIVE: TELEPHONE FOR EXTRUDED PRODUCTS APPLY
 SALES BY CATALOG ONLY. MAKE OTHERS AVAILABLE.

A-16863	R.A.S.CO. (KENT)	12642
DRAWING NUMBER	CUSTOMER NAME	PART NO.
		DIE NO.

Robbie

A-13961	R.A.S.C.O. (KENT)	10241
DRAWING NUMBER	CUSTOMER NAME	DIE NO.
		PART NO.

Not used in NCTL-310-3720



TYP. WALL THICKNESS
 EXCEPT AS SHOWN
 .010 R ON ALL CORNERS
 EXCEPT AS SHOWN

ENLARGED VIEW 'A'
 SCALE: 2 X SIZE

PART NAME/USE		RAFTER	
DRN D.C.	CHK	DATE	9-5-90
DIE SIZE		EST WT/FT	2.789
FEEDER PLATE		EST PERI	32.168
BACKER		ADJ. PERI	21.061
BOLSTER		EST AREA	2.324
BILLET		CIRCLE SIZE	5.5-6
R/R		FACTOR	12
HOLDS		TYPE	HOLLOW

STANDARD TOLERANCES FOR METALLURGICAL PRODUCTS APPLY
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 PORTLAND, OREGON

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